

## PHYTOCHEMICAL NOTES.\*

No. 89. Oil of *Bystropogon canus*.

BY JULIA WHELAN.†

Writing from LaPaz, Bolivia, under date of June 29, 1921, Professor Rusby, Director of the Mulford Biological Exploration, sent the following communication:

"Ever since my residence here in 1885, I have had it in mind to sometime secure material of one or both species of *Bystropogon* that grows abundantly on the ledges of the basin in which LaPaz is situated, so that the volatile contents might be distilled and studied. This was one of the first objects of my present expedition and I have been greatly disappointed to find at this mid-winter season the hills are bare of both species. However, a small amount of one of the species has been obtained in a ravine below the city. This has been dried and packed into a gunny-sack and will be shipped to the Mulford Company in a few days, with instructions to forward to you. I had intended to send you two hundred (200) pounds, but I doubt if the amount that I have obtained will equal twenty-five (25) pounds. I hope that you will be able to do something with it.

"I think the species is *B. canus*, but it may possibly be the other, the name of which I do not recall at the moment.

"When fresh this shrub has a strong odor of pennyroyal, but after being dried this odor has become decidedly modified. It is possible that I may obtain more of it farther down but I think it unlikely."

Gildemeister<sup>1</sup> in 1916 records the oils from two species of *Bystropogon*, the one obtained from *B. origanifolius* L'Hérit in the Canary Islands, the other from *B. mollis* Kth. an "Argentine mint." But little is known about either oil, hence the statements may as well be quoted in full.

"814. Oel von *Bystropogon origanifolius*. Das Oel des auf den Kanarischen Inseln haefig vorkommenden Strauchs *Bystropogon origanifolius* L'Hérit<sup>2</sup> ist von hellgelber Farbe und ist im Geruch dem Poleioel aehnlich.  $d_{16}^{\circ}$  0,9248;  $\alpha_D + 2^{\circ}57'$ ;  $n_{D20}^{\circ}$  1,48229; S. Z. 0; E. Z. 11,1; E. Z. nach Actlg. 53, 83; loeslich in 2,5 Vol. 70% igen und 0.7 Vol. 80% igen Alkohols. Bei der Destillation geht es zwischen 162 und 234° ueber.

"Das Oel enthaelt wenig 1-Limonen (Tetrabromid, Smp. 104°), in der Hauptsache Pulegon (Oxim, Smp. 157°) und etwas Menthon (Semicarbazon, Smp. 180 bis 181°)."

"815. Oel von *Bystropogon mollis*. Die argentinische Minze, *Bystropogon mollis* Kth., gibt nach A. Doering<sup>3</sup> 0,4% aetherisches Oel.  $d$  0,918 bis 0,920; es siedet hauptsaechlich bei 210° und enthaelt ungefaehr 0.7% freie Saeuren, Spuren Phenol und 2,5% Fururol. Menthol scheint nicht vorhanden zu sein."

The herb arrived in Madison late in October 1921 but was in good condition in spite of its prolonged voyage. The 28 lbs. of material were distilled under the direction of Professor Richtmann. The first oil which separated from the aqueous distillate weighed 25.5 Gm. (= 0.2 p. c.). The aqueous distillate upon three cohobations yielded an additional 13.7 Gm. (= 0.1 p. c.) of oil. The last cohobate, when fractionated for water-soluble constituents, yielded only a few drops of oil.

Both the original and the cohobated oils were greenish in color not unlike bergamot oil. The odor of the original oil reminded more of fatty acid esters than menthol; to that of the cohobated oil there may have been a suspicion of mint

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<sup>1</sup> "Die aetherischen Oele," Vol. 3, p. 534.

<sup>2</sup> "Bericht von Schimmel & Co.," October 1902, p. 87.

<sup>3</sup> *Bol. Acad. Nac. Ciencias Cordoba*, 19, 379, 1913; *Jour. Chem. Soc.*, 106, 1172, 1914.

Later both of these odors seemed to disappear and a pulegone-like odor seemed dominant.

The small amount of oil precluded a chemical investigation. However, a few constants were determined. For the sake of comparison, these are herewith tabulated together with those of *Bystropogon organifolius* and *B. mollis*.

	Original oil.	<i>B. canus?</i> Cohobated oil.	<i>B. organifolius.</i>	<i>B. mollis.</i>
d	0.910 at 20°	0.980 at 20°	0.9248 at 15°	0.918 to 0.920
$\alpha_D$	-0.59°		+2°57'	
$n_D$	1.563 at 25°	1.4623 at 25°	1.48229 at 20°	
A. V.	0	0	0	(abt. 0.7 p. c. free acids)
S. V.	183	135	11.1	

The amount of oil remaining was just sufficient to acquire some crude notion as to its boiling temperature, hence it was fractionated. Not more than two or three drops came over below 200°, hence terpenes were conspicuous by their absence. (Contrast the limonene content of *B. mollis*.) Three fractions of a few cc each were collected which, however, sufficed to determine their density. The last fraction had a delicate blue color, whereas the original oil had been somewhat olive-green. The residue was dark in color and its odor was indicative of decomposition. The boiling temperatures, etc., of the fractions are, herewith, tabulated:

Fraction.	B. temp.	Amt.	$d_{20}^{\circ}$ .
1	200 to 225°	2 ccm	0.9274
2	225 to 235°	2.5 ccm	0.9536
3	235 to 240°	5 ccm	0.9610

Menthol boils at 212° and has a density of 0.890 at 20°; pulegone boils at 222° and has a density of 0.9393 at 23°. However, neither the bisulphide test nor the nitroso test for pulegone gave positive results. Neither did exposure at low temperature cause any menthol to crystallize out. Likewise, Flueckiger's test for thymol and carvacrol gave negative results. It is apparant that larger amounts of material will be necessary to obtain more satisfactory information about the composition of this oil obtained from one of a seemingly interesting group of plants.

#### TEMPERATURE REGULATOR.\*

For Automatically Controlling the Temperature of Water-Baths.

BY PAUL S. PITTENGER.

In two previous articles I described apparatus for maintaining temperatures above<sup>1</sup> and below<sup>2</sup> that of the ordinary room.

In the two forms described, the temperature was controlled by means of a toluol-mercury electric regulator operated by dry cells, the regulator serving to make and break the battery current to a relay which in turn either opened or closed the

\* Read before Scientific Section, A. Ph. A., New Orleans meeting, 1921.

<sup>1</sup> "An Improved Apparatus for Testing the Activity of Drugs on the Isolated Uterus," JOUR. A. PH. A., 7, 512, 1918.

<sup>2</sup> "A Constant Temperature Bath for Maintaining Temperatures Lower than That of the Room," *Ibid.*, 5, 1261, 1916.